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unhappily, died shortly after the end of the journey from the effects of exposure. There is a provoking lack of appreciation of geographical form, and a want of understanding of geological structure, that deprives the observations of much value; and the pen-drawings that illustrate the book in good number are extremely rough. Perseverance and energy are, however, apparent enough in the success of the expedition; and the itinerary notes as to roads, supplies, and water, have a great value for those who may have to repeat the author's journey in this desert country. The party entered from the southern coast at Gwadar; and, after traversing for some two hundred miles a barren region of flat valleys or plains abruptly broken by mountain ranges, they reached the desert interior basin, into whose depressions the Mashkel flows from the south; the Halmand and others, from the north-east and north; and several smaller temporary streams, from the surrounding or dividing ranges, forming salt plains or marshes (hamun) at the lowest points. This district is absolutely barren, and very flat, broken only by sand-ridges, or occasional rocky peaks that rise like islands over the level plain. The largest central depression, known as the God-i-zirreh, is a dry salt waste about seventy miles long east and west, and twenty miles wide, surrounded by a barren sandy desert; and the passage across the southern margin of this desolate tract, hitherto unexplored, to a point named Shah Godar, exposed the explorers to great hardships. Water was found there only by digging in the sand of a dry stream-channel (175-185). This was their farthest station; and from it they returned eastward to Jacobabad, in Sind. The people were found avaricious and untrustworthy: their towns

were of the most forlorn description. The difficulty of learning local names was not small. The instructions given by a local official to a guide who was to accompany Macgregor were overheard by him: 'This sahib will ask you the name of every hill, every river, and every hut you see.' — 'What for?' — 'Heaven only knows! These sahibs always do that: they ask the name of every thing, and then write it down.' — 'But how am I to name all the hills?' — 'Call them any thing you like, and he will write it.' It seems, that while the people have names for the ravines that they follow, and for the stopping-places on them, they generally have no names for hills and ranges; nor have they any idea of the connection of mountains with each other, or of any system of drainage. Sand-hills are very numerous on the deserts; and, on the plain north of the Mashkel hamun, a peculiar form was noticed, provoking one of the few pieces of careful description in the book (p. 157). The examples were very numerous, and all closely alike; their form was crescentic, and the largest were sixty feet high at the middle of the curve, descending to the general level at the horns; the outer slope is 30° , and the inner 45° with a still steeper inclination at the outer side of the top of the ridge; they stand on a perfectly level plain, with the curve to the north or windward, and horns to the south. One would 'afford cover enough for a regiment or two.' The author imagines that some obstruction like a bush formed the nucleus about which the sand originally gathered. A sketch-map accompanies the volume; but there is often an unfortunate disagreement in spelling between it and the text. Table of contents and index are lacking.

WEEKLY SUMMARY OF THE PROGRESS OF SCIENCE.

MATHEMATICS.

Strain of an isotropic solid. — Mr. Stearn has given a very brief method for obtaining the expression for the internal energy per unit volume of a strained isotropic solid. — (*Quart. journ. math.*, Feb.) T. C. [967]

Elliptic functions. — Mr. Glaisher has given a series of integrals of functions depending upon elliptic functions. The paper is of such a character that it is impossible, in this place, to do more than refer to it. It may, however, be remarked that the set of integrals obtained constitutes a valuable addition to the known elliptic function formulae. A continuation of the investigations may be inferred from the manner in which the author has introduced the present article. — (*Quart. journ. math.*, Feb.) T. C. [968]

Spherical triangle. — Professor W. W. Johnson

remarks, that in the proof of the addition theorem in elliptic functions by means of a spherical triangle whose sides are ϕ , ψ , and μ , where $\phi = \text{am } u$, $\psi = \text{am } v$, $\mu = \text{am } (u + v)$, and k is the ratio of the sines of the angles to the sines of the opposite sides, it is usual to state that the angle opposite to the side μ is obtuse, so that its cosine is $-\Delta\mu$, if the other angles are acute, so that their cosines are $\Delta\phi$ and $\Delta\psi$. This may be shown to be a consequence of the assumption that k is less than unity. The present note aims to show that the restriction, $k < 1$, may be removed, in accordance with which $\Delta\mu$ is always positive; proving directly, that, in all cases, the cosine of the angle in question is $-\Delta\mu$. It is further shown, in order to complete the proof, that the triangle from which the formulae are derived is possible for all real values of u and v , as well as k . — (*Quart. journ. math.*, Feb.) T. C. [969]

PHYSICS.

Liquefaction of oxygen and nitrogen, and congelation of carbonic disulphide and alcohol.—On boiling ethylen in vacuo, Wroblewski and Olszewski obtained a minimum temperature of -136°C . With the temperatures thus obtained, which were measured with a hydrogen thermometer, experiments were performed on liquefaction and congelation. Under the pressures 26.5, 24.8, and 22.5 atmospheres, oxygen began to liquefy at the temperatures -131.6° , -133.4° , and -135.8° . It formed a colorless and transparent liquid with a well-defined meniscus. Carbonic disulphide congelated at -116° , and melted at -110° ; alcohol became a viscous oil at -129° , and solidified at -130.5° ; nitrogen formed a colorless liquid with a visible meniscus. — (*Comptes rendus*, xcvi. 1140.) C. F. M. [970]

Electricity.

Alleged luminosity of the magnetic field.—Professor W. F. Barrett says, "It is well known that the late Baron von Reichenbach claimed to have discovered a peculiar luminous emanation arising from the poles of a magnet, resembling a faint electric discharge in rarefied air."

Prof. Barrett and several other gentlemen, members of a committee appointed by the Society for psychical research, have been making experiments with a view to proving or disproving the existence of the alleged phenomenon. No member of the committee appears to have been able to see the emanation; but the committee did discover, in some way not detailed, a certain gentleman, Mr. G. A. Smith, and a boy, Fred. Wells, 'an assistant in a baker's shop,' who each appeared able, in a room perfectly dark to other people, to see a faint glow, like a waving cone of light, at either pole of a strong electro-magnet, and to tell, by the appearance or disappearance of this glow, when the current was turned on or off by means of a commutator in charge of several gentlemen in an adjoining room.

Prof. Barrett seems to have taken various precautions to avoid deception, conscious or unconscious, on the part of the principal actors in the affair; but it is to be hoped the committee will not rest from its labors till it has found some means of making the alleged luminosity visible, not merely to bakers' assistants and other more or less irresponsible persons, but to trained scientific observers. — (*Phil. mag.*, April.) E. H. H. [971]

ENGINEERING.

Theoretical mechanics.—Mr. George F. Swain presents an article upon the application of the principle of virtual velocities to the determination of the deflection and stresses of frames. An exact method of finding the elastic deflection in any direction of any point of a frame of any kind, due to Lamé, is first explained. The determination of deflection is in itself a problem of small importance. It finds its application, however, in the calculation of the so-called 'statically undetermined' structures, such as the continuous girder, and the arch with fewer than three hinges, where the forces acting depend upon the condition that the deflection of some point in the frame in some particular direction must be a given quantity. These structures are taken up in succession, and the general equations to be used in their calculation are given. Trusses with superfluous bars are next discussed; and a historical account of the literature of the subject closes the article. — (*Journ. Frankl. inst.*, Feb., March, April.) G. L. V. [972]

Naval iron vessels.—The advisory board of the navy department reports in favor of fitting up the League Island navy-yard to build the iron and steel ships to be constructed. — (*Bull. iron steel assoc.*, April, 1883.) R. H. T. [973]

Forced draught in steamers.—Experiments on the Satellite and Conqueror, reported by R. J. Butler to the Royal institute of naval architects, indicate that forced draught is not advisable on long runs, but that it is useful on runs of less than six hours. For such cases a fan draught is recommended. — (*Engineering*, March.) R. H. T. [974]

Hydraulic machine-tools.—Mr. R. H. Tweddell describes to the British institute of civil engineers forms of machine-tools driven by hydraulic pressure. Riveting has long been practised with hydraulic riveters; hydraulic stamps and forging-presses are now made to do good work; machine-tools have been made by Armstrong; and an hydraulic system of power-transmission has been adopted at Penhouet, France. Portable hydraulic machine-tools are found to save greatly in floor-space, and to save power as well. — (*Engineering*, March 23.) R. H. T. [975]

CHEMISTRY.

(General, physical, and inorganic.)

Borotungstic acids.—D. Klein prepared disodic borotungstate ($14 \text{ WO}_3 \cdot 2 \text{ B}_2\text{O}_3 \cdot 2 \text{ Na}_2\text{O} \cdot 4 \text{ H}_2\text{O} + 25 \text{ H}_2\text{O}$) by adding the required amount of boracic acid to neutral sodic tungstate. Although other salts were prepared from the sodium salt, several attempts to separate the acid in a state of purity were unsuccessful. The mother liquors of the sodic borotungstate contained a sodium salt of tungstoboric acid, which was precipitated as the barium salt by adding baric chloride. This acid, which is comparatively stable, was prepared by treating the barium salt ($9 \text{ WO}_3 \cdot \text{B}_2\text{O}_3 \cdot 2 \text{ BaO} + 18 \text{ H}_2\text{O}$) with dilute sulphuric acid. Tungstoboric acid proves to be a convenient reagent for characterizing the alkaloids and peptones. With even a minute quantity of the salts of quinine, cinchonine, strychnine, morphine, and codeine, it gives a white precipitate. With peptones it behaves like phosphotungstic acid. The author finds that cadmic tungstoborate is well adapted for use in the mechanical separation of the mineralogical elements of rocks in petrography. In the solid form, its specific gravity is 3.28, and a liquid may be obtained from it of any density between 1 and 3.8. At 75° – 80° it melts in its water of crystallization, giving a sirupy liquid of sufficient density (3.7) to float garnet or spinel. — (*Ann. chim. phys.*, xxviii. 350.) C. F. M. [976]

Action of chlorine on certain metals.—When thoroughly dried chlorine was allowed to remain in contact with Dutch metal, A. Cowper found, that, apparently, no chemical action had taken place at the end of three months. On introducing even a trace of moisture, the chlorine was rapidly absorbed. Zinc and magnesium were not attacked by the gas after it had stood several days in contact with fused calcic chloride. Silver and bismuth were acted on slowly; while tin, antimony, arsenic, and mercury were attacked with the same energy as in the moist gas. In the dried gas, sodium remained untarnished. Potassium, at first bright, became slowly covered with a purple film, probably of the subchloride. — (*Journ. chem. soc.*, cxxlv. 153.) C. F. M. [977]

Drying gunpowder magazines.—It having been officially recommended that chloride of lime should be used for removing the moisture from magazines, Prof. Munroe held that this was due to a con-

fusion of the terms 'chloride of lime' and 'chloride of calcium.' He claimed that chloride of lime was both inefficient for removing the moisture, and deleterious in its action on the powder. Experiments were made which showed, that, while chloride of lime absorbed 30.70 % of water, chloride of calcium, exposed under the same conditions, absorbed 60.50 %. Again: two samples of a gunpowder were treated with water. One sample was exposed to the air; the other, for the same time, to the gas liberated from chloride of lime by the action of CO_2 . In the first, .16 % of sulphur was found as sulphate; in the second, 1.60 % existed as such. — (*U. S. nav. inst.; meeting May 10.*) [978]

Purification of drinking-water. — Dr. F. Roeder finds, that from three to six drops of officinal dialyzed iron will carry down the solid matter suspended in one litre of muddy water from the Ohio River. About two drops of the reagent are required to clarify water colored with one drop of blood. Albuminoids are removed by dialyzed iron; perhaps, also, the other unwholesome organic contamination. For purification on a large scale, ferric chloride and sodium carbonate may be used. The precipitate may be removed by filtration or decantation. — (*Dep. sc. arts Ohio mech. inst.; meeting May 10.*) [979]

Formation of crystallized vanadates by fusion. — By heating vanadic acid with sodic bromide and a small quantity of baric chloride, A. Ditte obtained baric vanadate, $\text{Ba}(\text{VO}_3)_2$, in small transparent crystals. Strontic vanadate was prepared by fusion of the acid with sodic bromide and strontic bromide. Vanadates of lead, cadmium, zinc, manganese, and nickel, were formed in the same way. — (*Comptes rendus*, xcvi, 1048.) C. F. M. [980]

A compound of phosphoric and silicic oxides. — MM. Hautefeuille and Margollet observed the formation of the compound $\text{P}_2\text{O}_5\text{SiO}_2$ when metaphosphoric acid was heated to fusion, and silicic oxide added to the fused mass. The silica was prepared by decomposing silicic fluoride with water. — (*Comptes rendus*, xcvi, 1052.) C. F. M. [981]

Action of carbonic oxide on the vapor of water. — When carbonic oxide was heated with water to 250° – 275° in a closed tube, L. Marquenne noted the formation of carbonic dioxide and formic acid in small quantity. From the result of this experiment, the following conclusions were drawn: 1. Carbonic oxide is a stronger reducing agent than hydrogen; 2. Carbonic dioxide is permanent in presence of hydrogen at temperatures below the point of its dissociation; 3. The carbonic dioxide and hydrogen formed during the decomposition of formic acid by heat is the result of a secondary action between carbonic oxide and water. — (*Bull. soc. chim.*, xxxix, 308.) C. F. M. [982]

GEOLOGY.

Geology of Buffalo Peaks, Colorado. — These rise in the highest point 13,541 feet above sea-level, and consist of a narrow, curving ridge, with a peak at each end. The upper portion is composed of andesite (hornblende), and the lower of tufas of various kinds, the whole resting on granite and upturned sedimentary rocks. It is interesting to note that Mr. Emmons states, that, in the present condition of microscopical lithology, the earlier classification of many rocks as trachytic or andesitic are rendered doubtful, and that "many facts already observed by us suggest a doubt whether von Richthofen's classification of volcanic rocks will be found to hold good everywhere in Colorado, and even that many modifi-

cations of the relations of the older eruptive rocks, as well as those of tertiary age, may be found necessary." — (*Bull. U. S. geol. surv.*, i, 11.) M. E. W. [983]

Thickness of the continental glacier. — T. C. Smock, of the New Jersey geological survey, has examined the vertical distribution of marks of glacial action in northern New Jersey and southern New York, and concludes, from the difference in altitude of closely adjoining drift deposits, bowlders, and scratches, that the ice must have been from two to four hundred feet thick along its southern margin, from Perth Amboy to the Delaware. To determine its surface slope, the Catskill Mountains were studied, and marks of glacial action found up to altitudes varying from 2,500 to 3,250 feet. Above this, the rock outcrops are more precipitous, even on the northern side, and the detritus is local and angular, and hence it is concluded that the ice reached no higher. From these figures, a surface slope southward of less than half a degree, or under thirty feet to a mile, is obtained, and depth sufficient to submerge the Highlands and Shawangunk Mountains of southern New York. — (*Amer. journ. sc.*, xxv, 1883, 339.) W. M. D. [984]

Lithology.

Hypersthene-andesite. — Dr. W. Cross's microscopic examination of some of the supposed augitic andesites in rocks from Buffalo Peaks (see 983) showed that the pyroxenic mineral was of two kinds, hypersthene and an unknown triclinic one, as determined by their optical characters and a chemical analysis of the former. Since a notice of an abstract of his work has already appeared in SCIENCE (see 375), only some omitted points will be noticed here.

Besides the position of the optic axes, the chief optical distinction between the hypersthene and the augite (?) is the pleochroism of the former, and the absence of it in the latter, according to Rosenbusch and Cross. A hasty examination of some andesitic rocks by the present writer, since this bulletin was seen, has shown that the pleochroic mineral in some of his sections is not orthorhombic; and from his past studies he can testify, that, if pleochroism is to be relied upon at all, then hypersthene is widely distributed in andesitic rocks, both in North and South America, as well as in gold-bearing and other sands. Dr. Cross claims, that, in all but two of the augite andesites described by Zirkel from the Fortieth parallel collection, the predominating pyroxene is the hypersthene. Cross is in doubt whether the triclinic pyroxene is a distinct species, or augite showing anomalous optical action. Following the current classification of the andesitic rocks which groups them according to their pyroxenic constituent (including hornblende and mica), we shall have enstatite, hypersthene, diallage, augite, hornblende, and mica andesites, — six different species, — to say nothing of the many made out of the older and more altered andesitic rocks. It would seem, that, in the pyroxene group, a similar mixed series exists as has been found in the feldspars, with three different crystallographic systems; and the same difficulty may be expected in their use in rock classification.

The paper is a well-written and very valuable contribution to the mineralogy of the andesites; and, from the common lithological stand-point, the conclusions drawn appear to be just. The freedom of opinion, accompanied by the rapid change of views since the survey was organized in 1879, as manifested in the recent publications, is a most encouraging and promising sign for the future. — (*Bull. U. S. geol. surv.*, i, 19.) M. E. W. [985]

GEOGRAPHY.

(North America.)

The Blue Hills of Massachusetts, near Boston, are roughly mapped by E. G. Chamberlain; and the view from their highest summit, six hundred and thirty-five feet, is described in detail. Among the visible points are Holt's Hill in Andover, and Manomet in Plymouth, each about thirty miles distant; Wachusett, forty-four miles; and Grand Monadnock, sixty-seven and one-half. One hundred and twenty-five villages were identified, and many others were sighted. — (*Appalachia*, iii. 122.) W. M. D. [986]

Eastern Cuba. — W. O. Crosby describes the topographic features of eastern Cuba as dependent on the following structural elements: eruptive rocks, making sharp, serrated mountains, of which the Pico de Tarquino exceeds eight thousand feet; these are flanked by ridges of slates and schists, generally of later date, as at least some of the eruptives penetrate them in tongues and dikes; finally, there are coral-line limestones in terraces of marked uniformity for considerable distances along the shore. The terraces stand along the northern coast at altitudes of thirty, two hundred to two hundred and fifty, five hundred, and eight hundred feet. The lowest is most distinctly of coral origin, and closely resembles the reef growing in the neighboring sea. Passing up to the older ones, the limestone becomes more distinctly crystalline, and the corals and shells are in great part obliterated; but the resemblance, coupled with the progressive change, serves to show identity of origin. Some of the terraces slope away from their precipitous front toward the mountains, and are hence regarded as old fringing reefs. The highest limestone forms the upper thousand feet of a bold mountain called *el Tunque*, eighteen hundred feet high. The harbors along the present shore are roughly circular openings behind a narrow deep entrance in the outer reef; the streams back of the harbors flow over detrital fillings of their valleys. All these features are taken together as proof of oscillating variations in the level of Cuba, but in which the upward movement has predominated so strongly as to produce an elevation of two thousand feet in post-pliocene time. The great depression at which this irregular elevation began would have reduced the Greater Antilles to a few small rugged islands, and thus account for the absence of large land-animals, which were common enough there in pliocene and earlier times. [It may be suggested that the movements of depression, here supposed to have interrupted the general elevation, would be more fully proved if it were shown that the old reefs could not have grown outward from the shore during times of rest in the island's rising. The comparatively small and recent depression shown by the silted stream-channels does not necessarily imply previous depressions as well.] — (*Appalachia*, iii. 129.) W. M. D. [987]

(Africa.)

Flooding the Chottes. — In spite of the discouragement of an adverse report by the French government commission, Commander Roudaire has succeeded, with the aid of M. de Lesseps, in forming a company to furnish the funds for his project, and in December last went with a party of engineers to sound the lowland by borings between the Mediterranean and the Chottes. As far as reported, only sand was found, which promises an easy construction for the canal that is to form '*la mer intérieure Africaine*.' In March M. de Lesseps was to join the party to make plans for the further work. — (*Bull. soc. géogr. Marseille*, 1883, 36.) Later reports an-

nounce the return of Mr. de Lesseps with the conviction that the project can be successfully and advantageously carried out. W. M. D. [988]

Stanley and de Brazza. — M. Savorgnan de Brazza is well sustained by the French government in his projects of exploration. An appropriation of 1,275,000 francs was voted him recently by the chamber of deputies, — 449 ayes to 3 noes, — and confirmed by the senate; and a part of his expedition, under M. de Lastours, has already sailed from Liverpool. He plans to enter the interior from a point on the coast north of the Kongo, and is convinced that he will find a valley there, crossing the mountainous continental border, that will allow the easy construction of a railroad to his inner stations on the river. The expedition is to have a most peaceful character, and is placed under the patronage of the ministers of foreign affairs and of public instruction; and 65,000 francs are to be devoted to buying gifts for the African chiefs, who are to be conciliated. In the mean time Stanley, who was thought to be in Spain or at Nice regaining his health, has already sailed for the Kongo with 3,000 tons of merchandise, and, according to English despatches, has already advanced well up the river with 230 men brought around the Cape from Zanzibar by Capt. Cambier. — (*Bull. soc. géogr. Marseille*, 1883, 44.) [989]

The rights of Portugal. — The claim set up by Savorgnan de Brazza for French possessions on the Kongo, from which the quarrel between him and Stanley resulted, has aroused Portugal to assert her rights in western Africa. An able treatment of the 'Question of the Kongo' has lately been issued in Portuguese and in French by a committee of the Geographical society of Lisbon, in which they claim all the western African coast between lat. 5° 12' and 18° S., and an extensive but undefined territory inland, in right of discovery, possession, and recognition. Their pamphlet begins with examples of international decisions bearing on the question, and then, with much care, discusses the evidence of discovery from 1464, of possession from a little later date, and of recognition of their rights by other nations, France among the rest. It concludes with a note from Secretary-Gen. Strauch of the International African association, dated Brussels, Oct. 25, 1882, stating, that, as far as he knows, de Brazza had a mission from the French committee of the association, and funds from the French government; while Stanley was in the service of the international committee, and was charged with founding scientific and hospital stations on the Kongo, but not with acquiring territory. — (*Soc. géogr. Lisboa. La question du Zaire. Droits du Portugal*, 1883.) W. M. D. [990]

BOTANY.

Exudation of water from leaves. — By an examination of plants in very early morning, Volken has greatly extended the list of those from which liquid water exudes. He describes the water-pores of 150 species, distributed through 91 genera and 36 families. He appears to have exercised great care to avoid errors from the possible presence of dew upon the leaves. In order to ascertain the amount of water in the stems of the plants exhibiting this phenomenon, he made use of double scissors, by which a piece about half an inch in length could be cut out at one stroke, thus diminishing the chances of affecting the relative amounts of air and water in the part at the moment of separation. By the use of this simple contrivance, he has shown that the amount of air and water in a vigorous plant varies considerably during the day, even when the specimen is kept under uniform exter-

nal conditions. Most of his observations were made upon wild plants in open fields. — (*Ber. des konigl. bot. gartens, Berlin*, 1883.) G. L. G. [991]

Pollination of Araceae.—The contrivances which secure crossing in several species of *Dracunculus* and *Arum* have been restudied by Arcangeli, who finds the pollinators of *D. vulgaris* to be scavenger beetles, chiefly species of *Dermestes* and *Saprinus*, while *D. canariensis* is thought to be fertilized by *Cetonia* and other flower-beetles. On the other hand, *D. crinitum* and *A. italicum* depend upon diptera; the former relying on *Anthomyia* and related genera, while the visitors of the latter are mainly species of *Psychoda* and *Sciara*. The characteristic odors of the several species, which serve to attract the particular insects best fitted to carry their pollen, and numerous structural peculiarities utilizing their visits, receive special attention. A few observations on the rise of temperature in the aroid spathe, and a list of references on the subject, are also given. The writer introduces two convenient terms—osmophore (*οσμη, φερειν*) and anthophore (*ανθος, φερειν*)—to designate respectively the upper and lower parts of the spadix. — (*Nuov. giorn. bot. ital.*, Jan.) W. T. [992]

Anther of Roscoea.—Lynch describes and figures the lever-like stamen of *Roscoea purpurea*, which, like the similarly hinged anthers of species of *Salvia* and *Calceolaria*, is so pivoted as to have the polliniferous end depressed by, and brought in contact with, visiting insects. In this case, however, the flexible style is carried with the moving stamen, so that its stigma receives pollen, previously collected on the back of the insect, at the same time that a new load is being taken. The contrivance has previously been described by Delpino. In this connection, the curious suggestion is made that *Salvia Grahamei*, the flowers of which are closed by the anther-levers, as in *S. fulgens*, etc., is pollinated by small insects, which, having forced their way into the flower, can escape only by creeping out over the upper end of the lever, where they are dusted with pollen, beside coming in contact with the stigma. The species, however, is apparently ornithophilous. — (*Journ. Linn. soc., bot.*, xix.) W. T. [993]

Withdrawal of pollinia in the bee orchis.—That the spontaneous removal of the pollinia from the anther-cells in *Ophrys apifera* is due to something besides gravity, would appear from the observations of Clark, which, however, do not give a very clear idea of the process. — (*Journ. bot.*) W. T. [994]

ZOOLOGY.

Mollusks.

Snails used for food in Spain.—Kobelt has issued for private circulation a reprint of his journey, 'Nach den säulen des Hercules,' for malacological investigations. Among other interesting matters in this entertaining brochure, we find an account of the snail-market at Valencia, and numerous references to the consumption of these mollusks for food, not only in the Iberian peninsula, but in Morocco and Algeria wherever the south Europeans have colonized. The Spanish do not merely eat the large vine-snail (*H. pomatia*), which is made use of in South France and Germany, but appear to consume all kinds which are large enough to be worth the trouble of collection, except a few (*Helix Gualtieriana*, *Leucochroa candidissima*, and *L. baetica*) which are reckoned tough and unwholesome. The women who deal in this kind of lenten food are called *caracolas* (from *caracole*, a snail), and congregate in a small open square used as a snail-market, cry their wares loudly,

and, to convince customers of the good quality of the animals heaped up before them alive in large baskets, crack the shells open with their teeth. *Helix alonensis*, the serrano or mountain snail, is considered to be the most delicate of all, and comes from the vicinity of the Vega. From Mallorca is imported *H. lactea*, which is found throughout southern Spain; and in the Valencia market Kobelt also obtained *H. Dupoteliana*, *vermiculata*, and *aspersa*. They were valued at about forty cents a hundred; and, in spite of prejudice, he felt compelled to acknowledge, that, when properly dressed, some of the kinds were really of delicate flavor. They are cooked, shells and all, in a broth with onions; extracted, stewed, and replaced in the shell to be served; or steamed with rice. Strangers rarely partake of these peculiarly Spanish delicacies; which, nevertheless, are so much esteemed by that nation as to be imported for home use, and even exported for the benefit of Spanish colonists in other parts of the Mediterranean. — W. H. D. [995]

Extraordinary Eulima.—That indefatigable collector, Henry Hemphill, has recently sent to the National museum, among other treasures of the sea from Florida, two specimens of a *Eulima* about 2.5 mm. long, which, except when viewed by transmitted light, have a perfectly sooty appearance. This for the genus is something never before known, and more remarkable in that group than a black swan among birds. — W. H. D. [996]

Arctic mollusks.—In the year-book of the recently established Tromsø museum, the land and fresh-water mollusks of the arctic regions of Norway are enumerated, with descriptions of several interesting varieties by Miss Bergithe Esmark of Kristiania. The author, whose paper is printed in English, reviews previous catalogues, and enumerates thirty-five species in arctic Norway, twenty-seven in West Finmark, seventeen in Nordland, and fourteen in East Finmark. In Tromsø, in about latitude 70° north, *Clausilia bidentata* has been found, and also *Helix arbustorum*. *H. pygmaea* reaches 70° 20' north latitude, which exceeds by several degrees its most northern range in Siberia, and probably elsewhere. Our own *Zoogenetes harpa*, discovered successively in the United States, Kamchatka, eastern Siberia (Dall), and the Amur region, is now found extending to the shores of the Arctic Ocean at the northern extreme of Europe. Besides the shell-bearing forms, there are also three *Limaces*; and the *Margaritana margaritifera* is in some places common, and frequently produces pearls. — W. H. D. [997]

North German miocene.—Koenen continues his researches on the fauna of that formation in a paper covering the holostomatous and tectibranchiate gastropods, the cephalopods and pteropods. He describes and figures many new forms. — (*Neues Jahrb. min.*, ii. 223.) W. H. D. [998]

Worms.

Segmental organs of leeches.—In continuation of the researches of Bourne and Lang, Oscar Schultz has carefully studied the segmental organs in five species of leeches. These structures are long convoluted tubules, presenting at least three divisions,—the terminal duct, which opens exteriorly; the middle piece, containing a simple canal; the inner part, with branching canals. In no case was the canal found to begin with a ciliated funnel, as in many chaetopods. The parts are difficult to unravel because they are much convoluted, and most of the middle and part of the terminal division is covered by the inner division. The beginning of the inner

division is, however, isolated, and does not cover other parts. In Clepsine this free part consists only of a single row of cells joined like beads on a string. The essential peculiarity of these organs is in the perforated gland-cells, of which there are two forms. The simpler form is found in the middle portion of the organ. Each cell is perforated by a lumen, which communicates and is continuous with the lumen of the next cell, so that a single string of cells forms a continuous canal. A more complicated form exists in the middle division, in that the cells are perforated by branching canals, which are continuous from cell to cell. Between these extremes certain intermediate forms have been observed. — (*Arch. mikr. anat.*, xxii. 78.) c. s. m. [999]

Pilidium larva.—In the last issue of *Studies* from the biological laboratory of the Johns Hopkins university, E. B. Wilson describes the pilidium larva of a nemertine. It is helmet-shaped, with the convex side more elevated than usual, and crowned by a small flagellum. The anterior margin of the bell is prolonged into four short arms, behind which is a deep sinus, followed by two arms on each side, the anterior largest of all. The young nemertines are developed in a folded position within the lower and posterior part of the larval envelope, and are distinctly segmented posteriorly. — (*Amer. nat.*, Jan.) c. s. m. [1000]

VERTEBRATES.

Direct action of alcohol on the heart.—A paper on the above subject was read by Prof. H. Newell Martin, based on researches carried out by him in conjunction with Mr. L. T. Stevens. The experiments were made on the hearts of dogs, completely isolated from all the rest of the body but the lungs. The pulmonary circuit was intact; but only the coronary system of the heart was left of the systemic circulation. The rest of the greater circulation was carried on through an artificial arterial and venous system. The heart was uniformly supplied with defibrinated dog's blood. The authors found, 1°. That when the blood supplied to the heart contained by volume $\frac{1}{4}$ of 1% of absolute alcohol nearly always, and when it contained $\frac{1}{2}$ of 1% invariably, the work done by the left ventricle, as measured by the quantity of blood pumped out in a minute against a given resistance, was greatly diminished. 2°. If the alcoholized blood were not supplied too long the heart could be restored by feeding it with pure blood. 3°. The diminution of work was due to an alteration in the physical properties of the cardiac muscle, in consequence of which the organ expanded greatly. At the height of its systole it almost completely filled the pericardium, and during diastole had no room to expand and take in more blood; hence it had little or none to pump out at the next systole. 4°. The contractile power of the ventricle is not at first affected, since, if the pericardium be cut away so as to give the dilated heart plenty of room for its expansion, as much blood is pumped around as if no alcohol were administered. If, however, the alcoholized blood be supplied to the heart for a considerable time, as ten or fifteen minutes, the muscular power of the ventricle is diminished. 5°. Alcohol in the above-named proportions does not affect the rate of beat of the isolated heart. 6°. An experiment made on a total abstainer to whom half an ounce of absolute alcohol, diluted with water, was administered, showed that the drug had no influence on the pulse rate, although the dose was sufficient to cause dizziness in the person experimented upon. — (*Med. chirurg. faculty Maryland; meeting April 20.*) [1001]

Reptiles.

Lingual glands of the frog during secretion.—The important discovery of Heidenhain, that the cells of the submaxillary glands undergo visible changes during their secretory activity, has led to numerous investigations on other glands. Among these is Biedermann's research on the lingual glands of frogs. From his prolix and inchoate article we extract the following conclusions: the glands are closely related to the mucous salivaries in character. They are follicular, with their lower ends dilated. The gland-cells have an outer nucleated zone, and an inner granular zone: the former, after the cells are hardened, is stained dark by carmine; in the inner zone, reagents cause the granules to swell, so that the zone becomes hyaline, and, as it does not stain, in sections it appears clear. To call forth the secretion, the glosso-pharyngeus of one side was irritated for from three to five hours; the tongue was then hardened in absolute alcohol; and, in transverse section, the resting glands were seen on one side, the active ones on the other. During secretion the granules are poured forth, and probably converted into mucin; for they are not mucin while *in situ*, because logwood does not stain them. In consequence of the exit of the granules, the cells become narrower (but retain their height), so that the glands are smaller. In the inner zone there is visible only a granular protoplasm, the intercellular walls are less distinct, and the so-called 'stützzellen' can no longer be well seen. No evidence was had to show that there was a production of new cells during secretion, such as Heidenhain has maintained occurs in other glands; nor do any of the cells appear to be destroyed. — (*Sitz.-ber. akad. wiss. Wien*, lxxxvi. iii. 67.) c. s. m. [1002]

Maturation and segmentation of the reptilian ovum.—C. F. Sarasin gives a preliminary notice of his researches on this subject. The most important point is the method of development of the yolk elements out of fine granules, and the continuation of this process during segmentation. The destiny of the nucleus was not satisfactorily ascertained, for the nucleus 'disappeared.' The segmentation differs from what has been hitherto observed in meroblastic vertebrates. — (*Biol. centrabl.*, iii. 108.) c. s. m. [1003]

Mammals.

(Man.)

The lines on the human skin.—The skin is covered by countless fine furrows. Lewinski has studied these, and arrived at the conclusion that they are bends (*knickungen*) produced by the movement of the skin, either over the joints, as at the knuckles, or directly by the muscles. When the cutis is contracted, the epidermis is laid into folds, which disappear again when the skin is stretched: so, as the cutis is stretched in the living skin with its natural attachments, when a piece of skin is cut out, it contracts, and the epidermis is thrown into folds. — (*Virchow's arch.*, xcii. 135.) c. s. m. [1004]

Sebaceous glands of the tongue.—Ostmann has counted the sebaceous glands at the root of the tongue in man, and finds that the range in number is about the same in children and in adults, and that they do not increase very much in number with age, and consequently, as the tongue grows, there are fewer and fewer to the square centimetre. In adults the number varied from thirty-four to a hundred and two: the average is sixty-six. In young children the number varied from seventy-four to twenty-eight; average, fifty. — (*Virchow's arch.*, xcii. 119.) c. s. m. [1005]

Weight of infants.—Biedert has studied somewhat the weight of sucking children, and gives a few tables of the weight of four children. He especially insists upon the importance, in weighing babies, of selecting a particular time of the day, and recommends two hours after the first feeding in the morning. By weighing twice after a meal, at different intervals, there is shown to be a loss. From a limited number of observations he obtained the following average losses during periods of ten minutes for different ages: first half of the first month, 3.3 grms.; second month, 5.9; third month, 7.7; fourth month, 8.3; fifth month (one child only), 8.1. These are the rates of loss from excretion of all kinds. The other principal point of Biedert's article is, that, with care in weighing, the accidental variations may be nearly all eliminated, leaving only those due to illnesses. In part second the growth of children with minimal nourishment is discussed from a medical stand-point. — (*Jahrb. kinderheilkunde*, xix. 275.) C. S. M. [1006]

ANTHROPOLOGY.

Ruins and graves in Greenland.—H. Rink, reviewing the later Danish explorations in Greenland, says that in the southern district of Julianshaab there are about one hundred localities showing old Scandinavian ruins, the largest and most conspicuous containing as many as thirty ruined buildings, consisting of stone walls of houses, shelter-walls, etc.

A number of Eskimo graves have been examined; and it was found, that, where stones were convenient to the dwellings, low mounds were erected. When these were absent, low hillocks, or elevated localities at greater distance, were selected for the burial of the dead. Near Narkerdluk, graves were found on a hill 440 feet high, and these could only be reached by climbing a very steep trail. They are usually single, though frequently two bodies are found in one. The graves are formed by placing stones in the form of a rectangle; and bodies are often found 'doubled up.' In a tomb measuring four feet long, two feet broad, and two feet in height, were found the skulls of thirteen adults and two children. One grave contained two bodies, across and on top of which lay a third. The most remarkable discovery, however, is the existence of apparent cenotaph tombs carefully constructed and covered, and in which the usual number and variety of trinkets were found lying upon the floor or in burial-vessels, but no indications of a body. The author inquires if these tombs can have been erected to the memory of persons who had disappeared mysteriously. — (*Peterm. mitth.*, xxix. iv.) J. W. P. [1007]

Researches in Yucatan.—At a meeting of the Société de géographie, M. Désiré Charnay read an account of his recent voyage to Yucatan and the country of the Lacandons. His mission was to study the documents, vases, temples, palaces, and inscriptions, in order to throw light on the age and origin of American civilization. The paper is, to a large extent, historical and geographical, but contains valuable accounts of the ruins of Aké and Chichen-Itza. Interesting descriptions are given of the large and ornate edifices devoted to the national ball-play, which edifices are believed to have been consecrated to the great civilizer, Cuculcan, the same as the Mexican Quetzalcoatl. The chief discovery mentioned is of the ruins of a city on the left bank of the river Usumasinta, in an unclassified region between Guatemala and the two Mexican states of Chiapas and Tabasco. These ruins greatly resemble those of

Palenque, and were named Lorillard City in gratitude to Mr. Lorillard of New York, who had generously contributed to the expenses of the expedition. — (*Compte rendu soc. géog.*, no. 21.) J. W. P. [1008]

Cossacks.—F. v. Stein furnishes a valuable paper on the history, culture, and distribution of the Cossacks, with a chart showing areas occupied by the several ethnic divisions. — (*Peterm. mitth.*, no. 71.) J. W. P. [1009]

The Solomon-islanders.—Mr. H. B. Guppy has recently visited St. Cristoval in H. M. S. Lark, and gives the results of his studies of the natives. "The average height of a man is about five feet three inches; span of extended arms, four to five inches more than the height of body; both sexes robust and well proportioned, with some exceptions; skin varies from very dark brown to dark copper, the elderly adults being darker skinned than the youth, from causes partly climatic, partly physiological. Some individuals are of a pale, sickly hue, owing to their being covered from head to foot with an inveterate form of body-ringworm,—a scaly skin-eruption which affects in a greater or less degree quite two-fifths of the natives of this part of the group. In its most aggravated condition, this parasitical disease implicates the skin to such a degree that the rapid desiccation and desquamation of the epidermal cells lead to a partial decoloration of the deeper parts of the cuticle. The hair is black, frizzled, and bushy among the younger adults, with a tendency to arrange itself into corkscrew-like spirals among the middle-aged men. Straight-haired natives are sometimes found. Hairiness varies much with individuals, but the surfaces of the body and limbs are generally free from hair. Skull, mesocephalic; index from .73 to .83, mean between .74 to .77; facial angle 85° to 90°; nose straight, coarse, short, with wide nostrils and depressed bridge." — (*Nature*, April 26.) J. W. P. [1010]

American bibliography.—Dr. Daniel G. Brinton thus calls attention to a work by Don Diego Barros Arana, published last summer in Santiago de Chile, entitled "Bibliography of anonymous and pseudonymous works on the history, geography, and literature of America." "The compiler is an expert bibliographer, and, in this quarto volume of 171 pages, traces to their authors 507 books on America, published anonymously or under false names. Their dates of issue vary all the way from 1493 to the Centennial exhibition in 1876. Señor Arana adds very instructive and often copious notes on the writers of these productions, and on their value or lack of value." Mr. Brinton adds further notes on the catalogues of Messrs. Robert Clarke, Henry Harris, Felix C. Y. Lobron, Joseph Labin, James C. Pilling, Julius Platzmann, and C. H. Berendt. — (*Proc. numism. antiq. soc. Philad.*, April 5.) O. T. M. [1011]

EGYPTOLOGY.

Pithom.—In letters under dates March 12, 18, and 26, M. Naville tells of further discoveries at Pithom. The name of the nome in which Pithom is situated is found to be An; this was placed too far south by Brugsch. The following are part of the treasures from Pithom: a seated statue, in black granite, of the high priest of Succoth; a fragment bearing the two cartouches of Ramses II., and the name Succoth; a tablet of black stone with the inscription recording "the foundation of the city of Arsinoë, at some distance from Pithom, by King Ptolemy Philadelphus. The day before, the workmen had found the base of a standing statue with two cartouches, one giving

the name of Arsinoë, but the other quite unknown. I could not make out to whom it referred, but the next day I saw quite clearly. The top of the tablet is occupied by two series of offerings made to the gods of the Heroöpolite nome by the King Ptolemy Philadelphus. Among the gods is his sister, and wife Arsinoë, with the two cartouches, num ab en shu, mer neteru; Arsina. Below are twenty-eight lines of text, written clearly at the beginning and end of the stele, but, unfortunately, very carelessly in the middle. However, the monument is perfect: there is not one sign wanting. It is one metre and a quarter high, and about one metre wide. . . . One thing interested me particularly in the inscription: it is the name of a locality of which Osiris is the god, and which is called Pi-Keheret. Now, I cannot help thinking that we have at last got the Egyptian name for Pi-hahiroth, and (this conjecture, perhaps, is a little presumptuous) that it was called by the Greeks *φαγγορίopolis*. This name of Pi-Keheret occurs twice in the text, perhaps oftener, — once in the offering scenes, and another time in the course of the narration. You will understand how important it would be to gain the site of this spot; and that the mere fact of its being in the Heroöpolite nome, in the neighborhood of Succoth and Arsinoë, would definitely put aside Schleiden's and Brugsch's theory of the exodus through Lake Serbonis."

M. Naville is about to publish a narration of the whole work at Pithom, in which he will fully discuss the many interesting questions which have sprung from that work. — (*Academy*, April 7.) H. O. [1012]

PHYSIOLOGICAL PSYCHOLOGY.

Children's minds. — In October, 1869, the pedagogical society of Berlin inquired by circular how

many of the children who entered the primary classes had seen certain common animals, insects and plants, public buildings, museums, parks, suburban pleasure-resorts, etc. Other questions related to the home, farm, natural history, God, Christ, prayer, and many such subjects.

Profiting by this experiment, Mr. G. Stanley Hall, last September, undertook to ascertain the contents of children's minds on entering the Boston primary schools. Much pains was taken to collate such questions as would yield the best results, and to utilize the most skilful kindergarten teachers in putting the questions. Even with all these aids and cautions, the results were often very amusing. Two tables are given by Mr. Hall, setting forth the words, and the per cent of children ignorant of them. The high rate of ignorance is absolutely astonishing. About ninety per cent did not know where their ribs were situated, and seventy-five per cent could not describe an island. Furthermore, those who knew certain facts — for instance, that cheese comes from the cow — apprehended them in the loosest manner, thinking, perhaps, that the cheese is squeezed from the cow as the juice from a lemon. The same ignorance or indefiniteness of knowledge marked the opinions of the majority of the children concerning natural phenomena, natural history, and physical experiments of the simplest kind. The author comes to the following conclusions: 1. Children know next to nothing valuable at the outset of their school life; 2. Children can best be prepared for school by familiarizing them with objects; 3. Teachers should carefully explore children's minds; 4. The concepts that are most common in the children of a given locality are the earliest to be acquired, while the rarer ones are later. — (*Princeton review*, 1883, 259.) J. W. P. [1013]

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

National museum.

Re-arrangement. — The collection illustrative of mammalian osteology, which is in many respects one of the finest in America, is at present undergoing a thorough examination, and will be re-installed for the purposes of exhibition and study. The collection is especially rich in carnivores and cetaceans.

Recent additions. — The French government has presented a complete series of Sèvres porcelains showing the stages of manufacture and the varieties of wares produced. — The government collections of Washington relics, including the Lewis collection, have been transferred from the Patent office to the museum. — Messrs. Prang and company of Boston have presented a beautiful collection illustrative of the art of lithography. — The museum has received from the British museum one of its two stuffed specimens of the Senegal manatee (*Trichechus senegalensis*), together with a skeleton of the same species. All the recent species of the Sirenians are now represented in the collections.

Notes. — The American pharmaceutical association will hold its session in the lecture-hall of the museum in September. — The preparators of the museum were severally awarded prizes for specimens of their art displayed at the taxidermists' exhibition held in New York in May.

STATE INSTITUTIONS.

State laboratory of natural history, Normal, Ill.

The fauna of Lake Michigan and the smaller lakes of the north-eastern part of Illinois. — Two weeks were spent by Mr. Forbes and assistants in continued dredging off Chicago for a distance of fourteen miles alongshore, from the harbor to about ten miles out. Animal life here was scanty, except within half a mile of shore. The commonest invertebrate forms were *Amnicola limosa*, *Somatogyrus isogonus*, *Pleurocera elevatum*, *Goniobasis livezeans*, and *Sphaerium solidulum*, among Mollusca; and *Daphnia hyalina*, *Cyclops Thomasi* n. s., *Diaptomus sicilis* n. s., and *Limnocalanus macrurus*, among Crustacea. *Pontoporeia* also occurred occasionally. The most abundant macroscopic plant was *Nostoc pruniforme*, forming small gelatinous nodules on stones. *Vaucheria tuberosa* was also not rare.

In order to obtain material for a study of the bottom fauna of the deeper regions of the lake, a trip was made to Grand Traverse Bay in Michigan, a long narrow arm of the lake of extraordinary depth near shore. Here, with the assistance of a steam-tug and a crew of four men, the dredge and trawl were hauled repeatedly in water varying from a depth of thirty to one hundred and two fathoms, and the margins of the bay were searched thoroughly and carefully from a yawl. Numerous specimens of Cottidae were ob-